MC 754
POWER AMPLIFIER

McIntosh®

OWNERS MANUAL

IMPORTANT SAFETY INSTRUCTIONS

THESE INSTRUCTIONS ARE TO PROTECT YOU AND THE McINTOSH INSTRUMENT. BE SURE TO FAMILIARIZE YOURSELF WITH THEM.

1. Read all instructions - Read the safety and operating instructions before operating the instrument.
2. Retain Instructions - Retain the safety and operating instructions for future reference.
3. Heed warnings - Adhere to warnings and operating instructions.
4. Follow Instructions - Follow all operating and use instructions.
   WARNING: TO REDUCE RISK OF FIRE OR ELECTRICAL SHOCK, DO NOT EXPOSE THIS INSTRUMENT TO RAIN OR MOISTURE.
5. Power Sources - Connect the power supply only to the type described in the operating instructions or as marked on the unit.
6. Power-Cord Protection - Route power-supply cords so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords at plugs, convenience receptacles, and the point where they exit from the instrument.
7. Ventilation - Locate the instrument for proper ventilation. For example, the instrument should not be placed on a bed, sofa, rug, or similar surface that may block ventilation openings; or, placed in a built-in installation, such as a bookcase or cabinet, that may impede the flow of air through the ventilation openings.
8. Heat - Locate the instrument away from heat sources such as radiators, heat registers, stoves, or other appliance (including amplifiers) that produce heat.
9. Wall or Cabinet Mounting - Mount the instrument in a wall or cabinet only as described in the owners manual.
10. Water and Moisture - Do not use the instrument near water - for example, near a bathtub, washbowl, kitchen sink, laundry tub, in a wet basement, or near a swimming pool, etc.
11. Cleaning - Clean the instrument by dusting with a dry cloth. Clean the panel with a cloth moistened with a window cleaner.
12. Object and Liquid Entry - Do not permit objects to fall and liquids to spill into the instrument through enclosure openings.
13. Nonuse Periods - Unplug the power cord from the AC power outlet when left unused for a long period of time.
14. Damage Requiring Service - **Service must be performed by qualified service personnel when:**
    A. The power supply cord or the plug has been damaged; or
    B. Objects have fallen, or liquid has been spilled into the instrument; or
    C. The instrument has been exposed to rain; or
    D. The instrument does not appear to operate normally or exhibits a marked change in performance; or
    E. The instrument has been dropped, or the enclosure damaged.
15. Servicing - Do not attempt to service beyond that described in the operating instructions. All other service should be referred to qualified service personnel.
16. Grounding or Polarization - Do not defeat the inherent design features of the polarized plug. Non-polarized line cord adaptors will defeat the safety provided by the polarized AC plug.

17. **CAUTION: TO PREVENT ELECTICAL SHOCK DO NOT USE THIS (POLARIZED) PLUG WITH AN EXTENSION CORD, RECEPTACLE OR OTHER OUTLET UNLESS THE BLADES CAN BE FULLY INSERTED TO PREVENT BLADE EXPOSURE.**

ATTENTION: POUR PREVENIR LES CHOCS ELECTRIQUES PAS UTILISER CETTE FICHE POLARISEE AVEC UN PROLONGATEUR, UNE PRISE DE COURANT OU UNE AUTRE SORTIE DE COURANT, SAUF SI LES LAMES PEUVENT ETRE INSEREES A FOND SANS EN LAISSER AUCUNE PARTIE A DECOUVERT.

The lightning flash with arrowhead, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

CAUTION: TO PREVENT THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK). NO USER-SERVICABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED PERSONNEL.

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

The serial number, purchase date, and McIntosh Laboratory Service Contract number are important to you for possible insurance claim or future service. Record this information here.

Serial Number

Purchase Date

Service Contract Number

Upon application, McIntosh Laboratory provides a Service Contract to the original purchaser. Your McIntosh Authorized Service Agency can expedite repairs when you provide the Service Contract with the instrument for repair.

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Your MC 754 Power Amplifier will give you many years of satisfactory performance. If you have any questions, please contact,

CUSTOMER SERVICE
McIntosh Laboratory Inc.
2 Chambers Street
Binghamton, New York 13903-9990
Phone: 607-723-3512

Take Advantage of 3 Years of Contract Service . . . Fill in the Application NOW.

McINTOSH THREE YEAR SERVICE CONTRACT

An application for A THREE YEAR SERVICE CONTRACT is included with this manual.

The terms of the contract are:

1. If the instrument covered by this contract becomes defective, McIntosh will provide all parts, materials, and labor needed to return the measured performance of the instrument to the original performance limits free of any charge. The service contract does not cover any shipping costs to and from the authorized service agency or the factory.
2. Any McIntosh authorized service agency will repair all McIntosh instruments at normal service rates. To receive the free service under the terms of the service contract, the service contract certificate must accompany the instrument when taken to the service agency.
3. Always have service done by a McIntosh authorized service agency. *If the instrument is modified or damaged as a result of unauthorized repair the service contract will be cancelled.* Damage by improper use or mishandling is not covered by the service contract.
4. The service contract is issued to you as the original purchaser. To protect you from misrepresentation this contract cannot be transferred to a second owner.
5. Units in operation outside the United States and Canada are not covered by the McIntosh Factory Service Contract, irrespective of the place of purchase. Nor are units acquired outside the USA and Canada, the purchasers of which should consult with their dealer to ascertain what, if any, service contract or warranty may be available locally.

The MC 754 is a direct coupled stereo power amplifier designed to operate with loudspeakers having a nominal impedance of 4 ohms to 8 ohms. The amplifier is rugged and reliable.

The mechanical and electrical design of the MC 754 is the result of the many years of engineering and manufacturing experience of the designers at McIntosh. This "know how", combined with meticulous attention to design and production details, makes the MC 754 another of the industry leading products produced by McIntosh Laboratory.

Some manufacturers of power amplifiers claim that their products do not require or use protection circuits and that such circuits compromise performance. It is indeed possible for such circuits to cause substantial amounts of distortion and undesirable listening effects. McIntosh Laboratory agrees that dilligent measures are required to allow unrestricted performance, but we also insist and can prove that protection circuits are desirable and necessary to prevent amplifier or loudspeaker damage due to abnormal circumstances and that they actually enhance performance.

The real genius of good design recognizes these problems and circumvents them while retaining the real merits of the protective circuits. McIntosh design satisfies these design requirements. These are the extra values that you receive when you invest in McIntosh equipment. It is precisely for this reason that it takes longer to complete a McIntosh engineering design task. But from such engineering dedication comes the McIntosh reputation for highest sound quality with greatest long term reliability.

The MC 754 incorporates seven protection circuits to insure its total reliability.

1. POWER GUARD

Power Guard, a unique and patented* feature of McIntosh power amplifiers, assures that each channel of the MC 754 will deliver full power, free of clipping distortion. Clipping is caused when an amplifier is asked to produce more clean power output than its design characteristics can deliver. Conventional amplifiers that are overdriven are capable of delivering large quantities of power when they are clipping, but the output will also have up to 40% harmonic distortion. The sound will be grossly distorted and the extra energy content of the clipped signal will damage most loudspeakers, particularly high frequency drivers. The McIntosh Power Guard circuit protects your ears and speakers from this kind of damage while delivering 100% of the distortion free power of which it is capable.

2. SENTRY MONITOR

The patented* McIntosh Sentry Monitoring circuit constantly monitors the output signal and instantly reacts to prevent overload of the output transistors. At operating levels up to design maximum, the circuit has high impedance and hasn't any effect on the program material

This circuit senses the dynamic operating time, temperatuve, voltage, and current of the amplifier output stage and controls the current flow. Should the operating levels exceed design maximum, the Sentry Monitoring circuit operates to limit the destructive current to the output transistors. Positive and negative halves of the output signal are independently monitored and protected.

3. THERMAL SHUT-DOWN

All power transistors have limits for the maximum amount of heat they can tolerate. The MC 754 uses a highly efficient amplifying circuit which produces relatively little heat for the output power produced. The amplifier has two oversized heat sinks to dissipate transistor generated heat. Under normal conditions, the transistors will operate well below their safe temperature limits. If ventilation is restricted by improper mounting, or if amplifier efficiency is destroyed by operating it into a short circuit, or a very low load impedance, extra heat will be produced. Thermal sensors will turn off the AC power if temperatures become excessive. This prevents the transistors from producing life reducing heat. When the temperature reduces to a safe value, the amplifier AC power will again turn on.

4. TURN-ON DELAY

The MC 754 has a turn-on delay circuit that delays amplifier operation for about 2 seconds after power turn-on. This prevents pops or thumps generated in other equipment from causing annoying noises or damaging your loudspeakers.

5. DIRECT CURRENT FAILURE PROTECTION

All power amplifiers which do not use output transformers to bypass DC (direct current) can destroy loudspeakers should there be a failure within the amplifier. Safety circuits are necessary to protect

*U.S. Patents #404873 and #3526846

loudspeakers. The MC 754 has a DC detecting circuit connected to the output of each channel. Should there be DC present, the circuit clamps the power supply to zero voltage to prevent damage to loudspeakers. This clamp action will blow the fuse. The circuit returns to normal when the cause for DC is corrected and the fuse is replaced.

6. POWER LINE TRANSIENT SURGE PROTECTION

High voltage surges are sometimes present on 120 volt power lines due to switching of heavy loads like air conditioners or furnace motors. These surges can destroy critical electronic circuits. The MC 754 power supply circuit is arranged to clamp momentary surges to safe levels.

7. FUSE

Even though it may not be thought of as such, the AC power line fuse is a significant protection circuit. Should current be consumed in excess of the design limits, the fuse will blow to prevent self destruction of the amplifier circuits. You are protected from excessive repair costs by the power line fuse.

Your enjoyment of the MC 754 will be enhanced by your day-to-day use of this superb instrument. Good listening.

You will derive the greatest enjoyment and most satisfaction from your MC 754 when you understand its operations and functions. Your time invested now will return added value to you because you will get the best results from your amplifier

The compact design of the McIntosh MC 754 allows it to be easily placed in a variety of ways. The typical installation is to simply place it directly on a shelf or cabinet. The bottom feet must be left in place since they raise the amplifier above the mounting shelf to allow the circulation of air through the bottom panel and up through the heat sinks. The mounting space must be left sufficiently open at the back or top to allow what heat that may be generated to easily ventilate.

The appropriate length and size of loudspeaker cable for your installation will help to preserve the quality of sound for which the loudspeakers have been designed. If undersize wire is used, resistance is added to the amplifier/loudspeakers combination which adversely affects the performance. Added resistance reduces the damping factor, modifies the frequency response and reduces the power output. Your dealer's advice will serve you best for your installation. The cable to each speaker should be of parallel construction or be loosely twisted together. The chart shows the recommended minimum wire size for the length of wire between the amplifier and the loudspeakers.

SPEAKER CABLE LENGTHS
AMPLIFIER TO SPEAKER

For 4 Ohm Load		For 8 Ohm Load		Wire Guage
Feet	Meters	Feet	Meters	AWG
15	4.6	30	9.1	18
25	7.6	50	15.2	16
40	12.2	80	24.4	14
60	18.3	120	36.6	12
100	30.5	200	61.0	10

These speaker cable lengths represent a wire resistance equal to 5% of the speaker impedance.

6 INSTALLATION

CONNECTING FOR STEREO OPERATION

Use shielded cables to connect the signal from the preamplifier or signal source to the power amplifier. To minimize the possibility of hum, the shielded cables should be of parallel construction or loosely twisted together, located away from speaker connecting cables and AC power cords. Be certain to use good quality shielded cables for all interconnections. Your dealer can advise you on the kind and length of cable that will best suit your installation.

Plug the left output of the preamplifier into the Left input jack of the power amplifier. Plug the right output of the preamplifier into the Right input jack of the power amplifier.

Set the MODE switch to the STEREO position.

Connect a speaker cable from the left speaker to the amplifier OUTPUT terminal strip Common and Left screws. The right channel speaker is connected in the same manner to the Common and Right screws on the OUTPUT terminal strip.

When multiple speakers are to be connected to either or both outputs the combined outputs must be calculated. For loads 8 ohms or higher, set the IMPEDANCE switch to HI. For loads 4 to 8 ohms set the IMPEDANCE switch to LO.

If the load impedance used is lower than the rated output impedance, the operating temperature of the amplifier output stage will rise. If the load impedance used is higher than the the output impedance, neither the quality of the sound nor the amplifier will be harmed, only the available power is reduced. For multiple speaker operation, run separate speaker cables from the amplifier to each speaker.

Because the crosstalk between channels is almost non existent, each channel can be used as a separate amplifier. (Example; use one channel for mono background program in one area and the other channel for paging in a separate area.)

CONNECTING FOR MONOPHONIC BRIDGE OR SINGLE CHANNEL OPERATION

When used as a monophonic or single channel power amplifier, the two channels are added in a bridge configuration to produce output up to 200 watts. For monophonic operation using the MONO mode, the amplifier can supply full power to output impedances of 8 or 16 ohms.

Plug a shielded cable from the signal source or preamplifier to the Right input jack only. Set the MODE switch to the MONO position. The MONO switch internally connects the output of the right channel input amplifier to both left and right channel power amplifiers with the phase of the left channel inverted to achieve bridge operation and increased power output.

MONO operation of the MC 754 amplifier requires the speaker load to be connected between channel L and R terminals. Connect one lead from the speaker to the Right channel R terminal and the other lead to the Left channel L terminal. *The common terminals are not used.*

INPUT LEVEL

The maximum input sensitivity of the MC 754 is 1.4 volts, with the input level controls at maximum (turned fully clockwise). With 1.4 volts fed in, the MC 754 will produce its rated output power. McIntosh preamplifiers have been designed to deliver 2.5 volts output with rated inputs. For best system signal-to-noise ratio when using McIntosh source equipment, set the MC 754 input LEVEL controls to the 2.5 volt position.

For source equipment other than McIntosh set the level controls nearest to the stated output rating of the source equipment.

POWER GUARD

POWER GUARD assures that the power amplifier section of the MC 754 can not be over driven, thus amplifier output clipping is eliminated. Clipping is caused when the amplifier is asked to produce more power output than it can deliver with low distortion. Amplifiers are capable of delivering large quantities of power when they are driven to clipping but then they can have more than 40% harmonic distortion. The extra energy content of the clipped signal will damage most speakers. This McIntosh advancement helps to protect your speaker from this kind of damage. The POWER GUARD circuit has a built in "waveform comparator" that compares the wave shape of the output signal to the input signal. If the non-linearity between the two signals exceeds 0.5%, POWER GUARD operates. Operation is indicated when the LEFT or RIGHT POWER GUARD indicators turn on. As long as the amplifier operates without overload the indicators remain off.

AC POWER

The red POWER lamp indicates that AC power is supplied to the amplifier. The MC 754 is rated for 120 volts 50/60 hertz. There is no power switch on the MC 754 as it is designed to be supplied with power from one of the switched AC outlets on the rear panel of a McIntosh preamplifier. An AC outlet is provided to supply power to additional equipment which will be turned on or off with the amplifier.

FUSE

A 5-amp fuse protects the MC 754 circuits. The fuse does not protect additional equipment connected to the AC power outlet.

MC 754 PERFORMANCE LIMITS

Performance limits are the maximum deviation from perfection permitted for a McIntosh instrument. We promise you that when you purchase a new MC 754 from a McIntosh franchised dealer, it will be capable of or can be made capable of performance at or exceeding these limits or you can return the unit and get your money back. McIntosh is the only manufacturer that makes this statement.

PERFORMANCE

McIntosh audio power ratings are in accordance with the Federal Trade Commission Regulation of November 4, 1974 concerning power output claims for amplifiers used in home entertainment products.

POWER OUTPUT

STEREO:

100 watts across 8 ohms or 4 ohm loads is the minimum sine wave continuous average power output per channel for 20 Hz to 20,000 Hz with both channels operating.

MONO (Bridged):

200 watts across 8 ohms or 16 ohm loads is the minimum sine wave continuous average power output from 20 Hz to 20,000 Hz.

OUTPUT LOAD IMPEDANCE

STEREO:

4 ohms or 8 ohms.

MONO:

8 ohms or 16 ohms obtained by connecting across the output terminals of both channels.

RATED POWER BAND

20 Hz to 20,000 Hz

TOTAL HARMONIC DISTORTION

STEREO:

0.02% maximum harmonic distortion at any power level from 250 milliwatts to rated power per channel from 20 Hz to 20,000 Hz, both channels operating.

MONO:

0.02% maximum harmonic distortion at any power level from 250 milliwatts to rated power from 20 Hz to 20,000 Hz.

INTERMODULATION DISTORTION

STEREO:

0.02% maximum if instantaneous peak power output is 200 watts or less per channel with both channels operating for any combination of frequencies, 20 Hz to 20,000 Hz.

MONO:

0.02% maximum if instantaneous peak power output is 400 watts or less for any combination of frequencies, 20 Hz to 20,000 Hz.

FREQUENCY RESPONSE (at one watt output)

+0, −0.25dB from 20 Hz to 20,000 Hz
+0, −3.0dB from 12 Hz to 70,000 Hz

RATINGS

IHF DYNAMIC HEADROOM

2.3dB at 4 ohm load
1.6dB at 8 ohm load

DAMPING FACTOR

Greater than 90 at 8 ohms

INPUT IMPEDANCE

20,000 ohms

INPUT SENSITIVITY

1.4 volt, level control provides for higher input voltages; 2.5 volt position indicated

POWER REQUIREMENTS

120 volts, 50/60 Hz, 0.3 to 4.0 amperes

GENERAL INFORMATION

SEMICONDUCTOR COMPLEMENT

43 silicon transistors
27 silicon diodes
2 integrated circuits

SIZE

13 1/8″ (33.3 cm) wide, 9 5/8″ (24.4 cm) deep by 5 9/16″ (14.1 cm) high

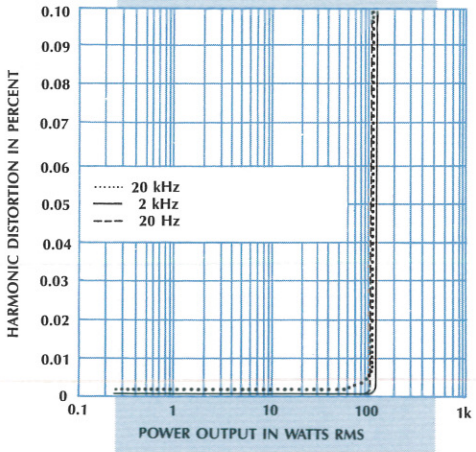
FINISH

Chrome chassis with black ventilating cover

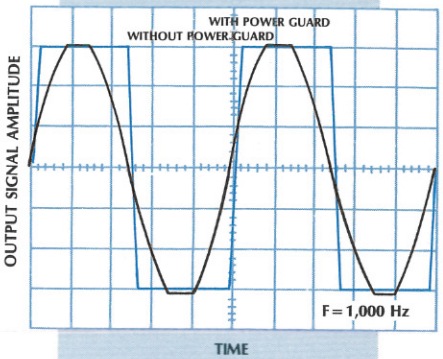
WEIGHT

21.5 lbs. (9.8 Kg) net
25.5 lbs. (11.6 Kg) in shipping carton

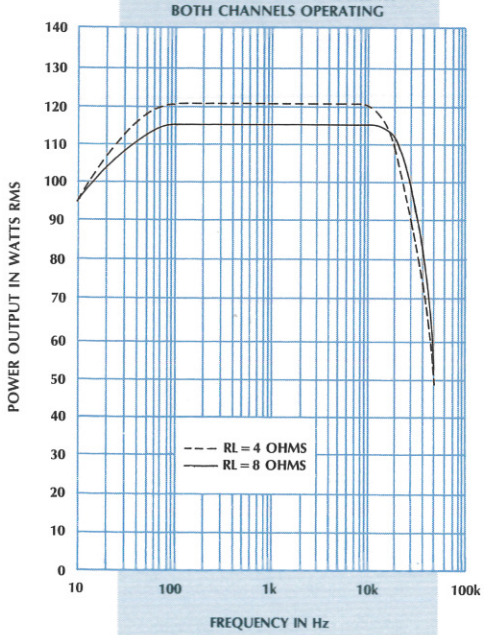
HARMONIC DISTORTION VS POWER OUTPUT
RL = 8 OHMS, BOTH CHANNELS OPERATING



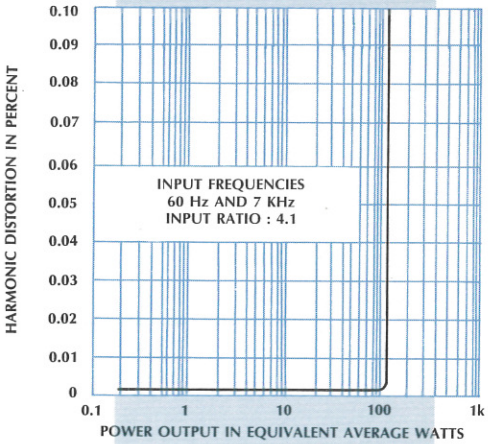
OUTPUT SIGNAL WAVEFORM SHOWING ACTION OF POWER GUARD TO ELIMINATE OUTPUT SIGNAL CLIPPING. POWER AMPLIFIER INPUT IS OVERDRIVEN BY 20 dB FOR BOTH OSCILLOGRAM TRACES.



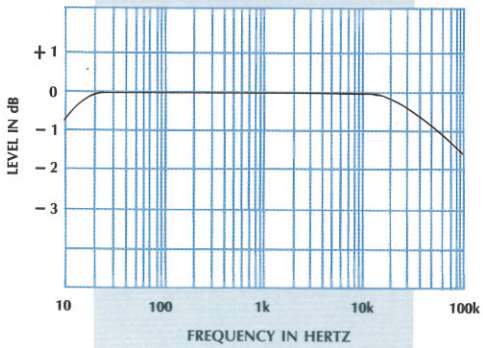
0.02% THD POWER BANDWIDTH
BOTH CHANNELS OPERATING



INTERMODULATION DISTORTION
VS. POWER OUTPUT
RL = 4 OR 8 OHMS, BOTH CHANNELS OPERATING



FREQUENCY RESPONSE
AT 1 WATT OUTPUT



10 PERFORMANCE CHARTS

The circuit arrangement is illustrated in the Block Diagram on page 12. The left and right channel amplifiers are identical.

The input signal is fed to the input level control, through an electronic attenuator, to the first amplifying stage. This stage is a balanced differential amplifier with negative feedback from the output stage applied to the inverting input. An active current source is used to supply the transistors common emmitter which improves the balance, lowers distortion, and rejects power supply modulation. The differential amplifier outputs feed full wave detectors for the power guard circuit (to be described later) and then feeds an active load consisting of a current mirror which combines the signals into a single ended output. This signal drives an emitter follower stage which is followed by a linear voltage amplifier stage. Collector current for the voltage amplifier is supplied by a two transistor active current source. Bootstrapping is not required. A current limiting transistor is connected to the emitter of the voltage amplifier to protect the transistor against abuse from a short on the amplifier output.

The output stage follows next. This stage is fully complementary with darlington connected drivers and output transistors. The output transistors are mounted to large aluminum heat sinks which efficiently dissipate heat to insure cool operation. A biasing transistor is attached to the heat sink and provides proper bias tracking for all operating conditions. Current flow in the output stage transistors is monitored by the Sentry Monitor Circuit*. This circuit senses the dynamic operating conditions of the amplifier output stage and controls current flow confining it to the safe limits of the output stage power transistors. This circuit prevents destructive currents should the amplifier output look into a short circuit or a very low load impedance. The output stage feeds its output through a heavy duty relay to the output terminals. The relay is controlled by a circuit which delays the amplifier turn-on for a second or two when the amplifier AC power is turned on, and disconnects the output immediately when the AC power is turned off. This prevents destructive and annoying transients from reaching the loudspeaker. The relay control circuit is also arranged to sense the presence of DC on the amplifier output. Should there be DC for any reason the relay will not close and speakers will be protected.

A negative feedback signal is fed from the amplifier output back to the inverting input of the input stage differential amplifier. Amplifier performance is controlled by this loop. It sets the gain, assures flat frequency response, lowers noise and distortion and increases the damping factor.

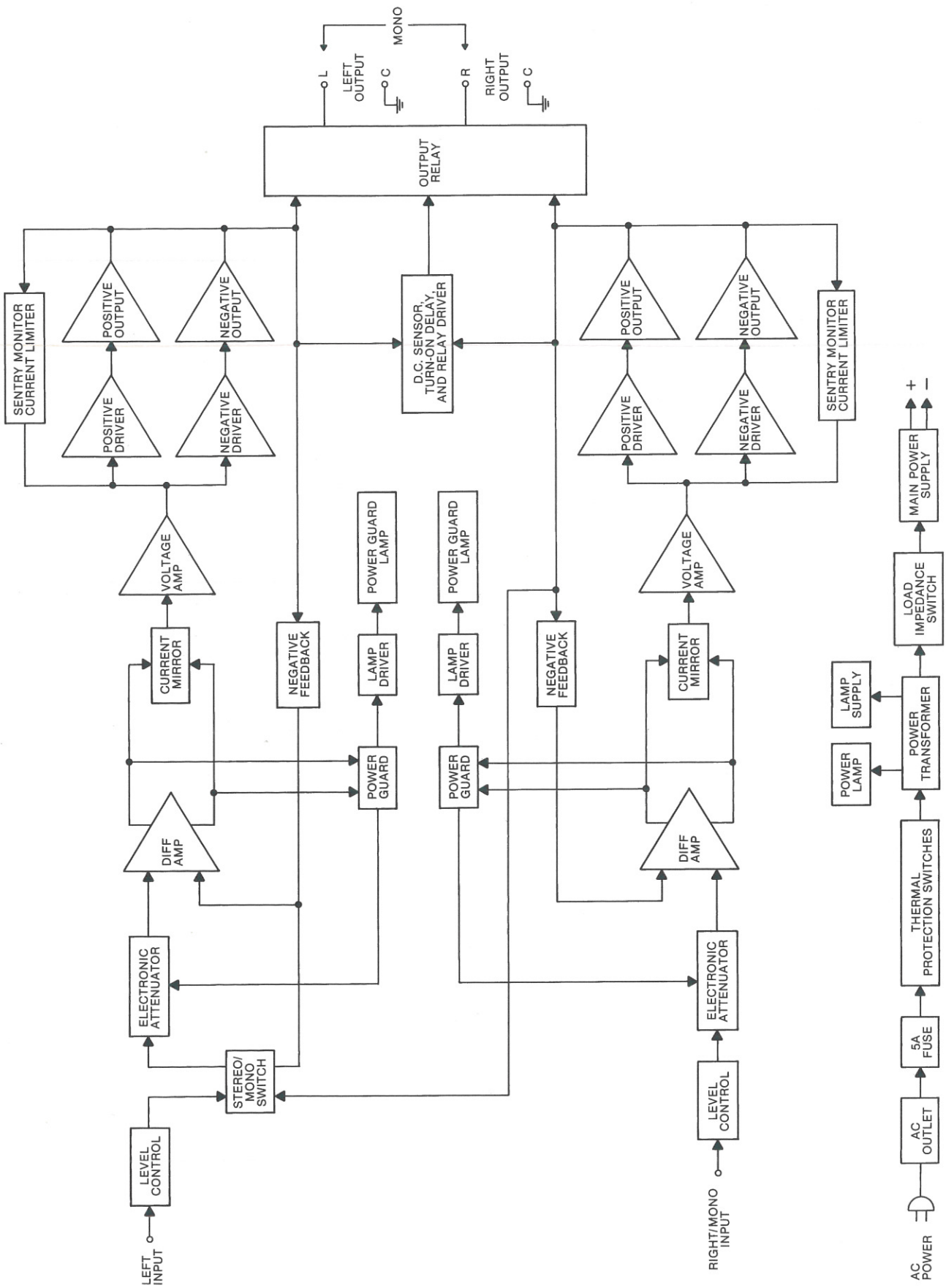
The full wave detectors mentioned earlier at the outputs of the input stage are part of the Power Guard** circuit. The detectors are activated when the amplifier output signal deviates from being an amplified replica of the input signal.The output and input signals are compared by the differential amplifier. If the output does not follow the input the differential amplifier output increases activating the detector. The detector output is amplified and fed to the Power Guard lamp indicator and to the electronic attenuator at the input of the amplifier. The attenuator serves to reduce the input signal, holding it to the maximum level that can be amplified without clipping or excessive distortion.

When the MC 754 is used in the mono mode the left channel is arranged in "bridged" mode with the right channel. The mono input feeds to and through the right channel amplifier. Part of the output of the right channel is fed to the inverting input of the differential amplifier stage at the input of the left channel amplifier. Thus, the left channel amplifier output is inverted or 180° out of phase with the right channel.

The power supply employs a large conservatively rated power transformer, full wave bridge rectifier and a pair of 12,000 uF computer grade filter capacitors. An impedance selector switch is connected to the secondary winding of the power transformer which allows the power supply output voltages to be switched to match the requirements for the output load impedance in use. Thermal cutout switches are mounted to the output stage heat sinks. They are connected to the primary winding of the power transformer and switch AC power off should the heat sink temperature become excessive. Excessive heat might occur if ventilation is restricted or if the load placed on the amplifier becomes shorted or has an excessively low impedance.

The MC 754 has been designed for long maintenance free life with extraordinary electrical performance.

*U.S. Patent #3526846
**U.S. Patent #4048573



12 BLOCK DIAGRAM

McIntosh®

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The continuous improvement of its products is the policy of McIntosh Laboratory Incorporated who reserve the right to improve design without notice.

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